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DCP/NRC1465
Project 711

August 28, 2000

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Mr. Samuel J. Collins

Dear Mr. Collins,

Thank you for your letter of July 27, 2000 that provided the results of the NRC staff's Phase 1 assessment of the AP1000 pre-application review. Westinghouse desires to proceed at this time with a portion of Phase 2 review as indicated below. The staff estimates exceeded our available budget, and we have prioritized the review tasks to remain within our budget limitations. It is possible that additional tasks may be added to the review if we can obtain additional financial support. These tasks would be added by a separate future letter request and a schedule will be determined at that time. At this point we would like the NRC staff to plan to proceed with resolving the following items:

- Applicability of AP600 Test Program to AP1000
- Applicability of AP600 Analysis Codes to AP1000
- AP1000 Design Acceptance Criteria
- AP1000 Exemptions

On the two items that were deferred, the following comments are provided. After considering the staff comments on Item 4 - AP1000 Probabilistic Risk Assessment, it is our belief that this item will not meet our criteria for Phase 2 work of contributing significantly to the efficiency of the Design Certification Review. Therefore, Westinghouse proposes to defer the Probabilistic Risk Assessment to Phase 3. Westinghouse remains interested in performing Item 1 - Scope of NRC Review, but will defer this task temporarily based upon the funding available.

Westinghouse desires to initiate the NRC review of the selected items on November 1, 2000 and we plan to provide the appropriate deliverables to you prior to that time as requested in your letter. Westinghouse has provided in Enclosure 1, the information requested in your letter to assist the staff to prioritize this requested pre-application against the four NRC goals. Westinghouse requests that a target schedule be established for the pre-review and requests that a target completion be established of February 2001. Enclosure 2 provides a description of our deliverables for Phase 2.

The test reviews are the most important reviews of the Phase 2 program. We renew our request to NRC to make every effort to assign the reviewers who performed the test assessment for the AP600 Design Certification Review to make NRC activities and decisions as effective, efficient, and realistic as possible.

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Per Jerry Wilson

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Westinghouse has in Enclosure 3, provided comments on the NRC staff "Phase 1 Results" and on the ACRS letter on the pre-review. For the most part, the comments are clarifications of whether certain items are in the scope of the Phase 2 pre-review. There are also a few technical clarifications or comments provided in the interest of efficient work process. Westinghouse is willing to meet to discuss any of the comments but does not consider a meeting necessary unless the staff would like to discuss the topic further. Westinghouse has in Enclosure 4 provided comments on the ACRS issues related to the review of the AP1000 design.

Very truly yours,

W. E. Cummins, Director
Advanced Plant Development

cc: J. N. Wilson

/Enclosures

1) "Westinghouse Assessment of Phase 2 Versus NRC Performance Goals"
2) "Descriptions of Westinghouse Submittals for AP1000 Phase 2 Goals for Application Review"
3) "Westinghouse Comments on Phase 1 Results"
4) "Westinghouse Categorization of ACRS Issues Related to the Review of the AP1000 Design"

Enclosure 1
Westinghouse Assessment of Phase 2 Versus NRC Performance Goals

Westinghouse is pleased to provide the following qualitative assessment of the AP1000 pre-application review (Phase 2) effort for the purpose of assisting NRR staff in prioritizing the Phase 2 review against the NRC's projected FY2001 workload. Phase 2 of the pre-application review will provide the NRC staff's evaluation of several key issues that Westinghouse has requested be reviewed to determine the optimum process for and the feasibility of a design certification application. As requested in the NRC letter of July 27, 2000, Westinghouse's assessment is presented in the context of the NRC's four performance goals as amplified in the NRC's Strategic Plan [NUREG-1614, Vol.2, Part 2]. Westinghouse believes that the measures that the NRC has selected to demonstrate the performance goal achievement are essentially keyed to licensing actions related to Operating Reactors and thus do not generally apply directly to this advanced reactor review process. Nevertheless, we have identified many aspects of the Phase 2 review that fulfill the descriptions of the underlying measures identified in the Strategic Plan. We have also provided Westinghouse's assessment (high, medium, low) of the degree to which we believe the Phase 2 evaluation meets the intent of each performance goal.

PERFORMANCE GOAL #1: Maintain safety, protection of the environment, and the common defense and security.

Westinghouse Performance Goal Ranking: High

This is the preeminent performance goal that takes precedence over all other performance goals. To achieve it, NUREG-1614 states that the NRC will give priority to those licensing actions and exemptions that provide the greatest safety benefit to the public. Phase 2 is geared to meet this expectation in the fullest measure.

While current operating reactors have proven very safe, the NRC-approved detailed probabilistic safety analysis associated with the AP600 ALWR design shows a safety factor improvement of two orders of magnitude over typical operating reactors. However, the AP600 was designed and certified prior to the deregulation of the US electricity market. In the deregulated market, each generator must compete favorably against alternative sources strictly on financial merits. In order for new nuclear power plants to be viable in this deregulated market, Westinghouse believes that further cost reductions must be achieved. The AP1000 utilizes the passive safety features certified on the AP600 but will be constructed at a much lower cost per kilowatt of generating capacity. By certifying a cost competitive design, Westinghouse believes that the NRC would be providing a very substantial benefit to the public safety and to protecting the environment. While the direct application is in the future, the magnitude of the safety benefit, in Westinghouse's opinion, compares favorably to the NRC's planned activities of which Westinghouse is aware. This benefit, however, will not be achieved without first performing the Phase 2 assessment.

NUREG-1614 also states that the NRC will encourage applicants, vendors, and others to inform the NRC at the earliest opportunity of planned future reactor activities so that the NRC will be prepared to respond. Phase 2 also meets the goal of giving the NRC the maximum advanced notification of the certification effort, and will give the NRC an excellent assessment of the key issues, the effort, and expertise that will be necessary for the certification effort, if Westinghouse and the U.S. nuclear industry elect to pursue design certification.

PERFORMANCE GOAL #2: Increase public confidence.

Westinghouse Performance Goal Ranking: Medium

10 CFR Part 52 was designed to make public participation more meaningful by affording the public the opportunity to interact with the NRC and the applicant at a stage prior to the commencement of construction activities. Some of the strategies to increase public confidence are clearly implemented in a plant Design Certification Program. The program includes processes that recognize public interests and concerns. For elements of the public that support a nuclear power option in electricity generation, an efficient approach to the safety evaluation of the AP1000 will enhance the public confidence in the NRC. For elements of the public that do not support the nuclear power option, the open and inclusive Design Certification safety evaluation process should enhance the perception of the NRC as a strong, fair regulator interested in timely public involvement. The dramatic simplification of the passive plant safety systems increases the potential for public understanding and involvement in the process.

It is clear that the public confidence in the NRC was positively impacted by completion of the AP600, System 80+ and ABWR design certification efforts. It is expected that similar positive impacts would be achieved from a successful AP1000 review.

PERFORMANCE GOAL #3: Make NRC activities and decisions more effective, efficient , and realistic.

Westinghouse Performance Goal Ranking: High

The proposed AP1000 Pre-Application Review is an excellent opportunity to demonstrate effective, efficient and realistic regulation. Several of the implementation strategies are applicable to the review and the measure to complete two key process improvements that increase efficiency, effectiveness, and realism could be applied to the AP1000 pre-application review. As discussed in the Westinghouse meetings with the staff on the licensing process for the AP1000, the entire objective of a phased approach to the review is to increase the efficiency and effectiveness of both the applicant (Westinghouse) and the staff review process. Westinghouse and the NRC staff agreed upon the multi-stage review process for the express purpose of leveraging the value of the AP600 Design Certification effort and increasing the efficiency and reducing the required resources for the AP1000 review by efficiently retaining the appropriate portions of the AP600 DCD. In addition, the process of estimating the cost, schedule, and resource needs of the pre-review prior to initiating the review is believed to be a significant process improvement over the AP600 Design Certification process. This estimating and planning phase may potentially be adopted by the NRC staff as a process improvement applicable to other tasks.

Specifically, the following implementing strategies are all achieved with the AP1000 Pre-Application review:

1. *To use risk information to improve effectiveness and efficiency*

   The design and licensing of the AP600 extensively used risk information to improve both the design, and to improve regulatory efficiency. Westinghouse used risk as a design tool to select features of the plant to effectively minimize the risk associated with an AP600. Working

together, the NRC and the AP600 stakeholders used risk information to improve the efficiency of the regulatory oversight associated with an AP600 with the Regulatory Treatment of Non-Safety Systems (RTNSS) process. The AP1000 builds on the efficiencies attained by the AP600 Design Certification, and an AP1000 Design Certification would employ the same risk measures as AP600. The phase 2 pre-application review process is essential for a successful AP1000 Design Certification.

2. *To make decisions based on technically sound and realistic information*

   The Phase 2 submittals will provide the NRC the technical information needed to determine whether the approach proposed by Westinghouse is feasible for certifying the AP1000 design. The phased approach is likely to identify and address key issues and concerns of the staff and the ACRS at the earliest opportunity, resulting in a more efficient process for the complete safety assessment of the AP1000.

3. *To anticipate challenges posed by the introduction of new technologies and changing regulatory demands and to take steps to ensure that the agency's regulatory process does not impede the use of new technology to improve safety, increase productivity, or reduce costs.*

   The design certification application for the AP1000 is in direct response to the economic deregulation of the electric power industry for which the agency has proposed to modify its regulatory processes in order to keep pace. Phase 2 is a modification of the standard design certification process and its timely completion is essential to keep pace with the economic deregulation of the industry. The Phase 2 effort provides the NRC with the ability to determine very definitively what challenges await the agency during an AP1000 design certification effort.

4. *The effectiveness of the NRC will also be enhanced by the continued utilization and honing of the staff skills necessary to conduct integrated plant reviews of advanced reactor designs.*

   Endeavors such as the AP1000 pre-application review provides challenges to the industry as well as the NRC to improve processes and contributes to the long-term viability of the industry.

PERFORMANCE GOAL #4: Reduce unnecessary regulatory burden on stakeholders.

Westinghouse Performance Goal Ranking: High

10 CFR Part 52 currently does not contemplate a pre-application review and an applicant would normally be required to submit an entire application to obtain an NRC acceptance review. The Phase 2 effort will enable Westinghouse to determine whether the design certification effort as proposed is technically feasible and will prevent the unnecessary expenditures and resource diversion involved with a certification application prior to the resolution of the key issues that would need to be addressed for Design Certification. This reduction in regulatory burden could potentially save Westinghouse millions of dollars and also provides for optimum utilization of NRC staff resources.

ADDITIONAL CONSIDERATIONS:

Chairman Meserve has expressed his intention that the NRC will be fully positioned to support future applications for advanced plants. Over the past decade, both the NRC and the industry invested significant effort and resources in attempting to fulfill this objective. However, Westinghouse believes that the currently certified ALWR designs will not be able to compete in a deregulated market unless the price of natural gas increases substantially or becomes unstable and/or the fossil fuel generators are assessed financial penalties for environmental considerations. Since those are uncontrollable and unpredictable factors, the AP1000 design certification application is necessary to position the nuclear option to compete in the deregulated market. Phase 2 is essential to achieving that objective for the nuclear industry and to achieving Chairman Meserve's stated intention for the NRC.

Enclosure 2
Description of Westinghouse Submittals for AP1000 Phase 2 Pre-Application Review

Applicability of AP600 Test Program to AP1000

In NUREG-1512, "Final Safety Evaluation Report Related to Certification of the AP600 Standard Design," the NRC states that the requirements of 10 CFR Part 52 have been interpreted to require that a passive plant vendor must develop and perform design certification test programs of a sufficient scope. This includes both separate-effects and integral-systems experiments to provide data to assess the computer codes used to analyze plant behavior over the range of normal operating conditions, transient conditions, and accident sequences.

Westinghouse will submit a report titled AP1000 Analysis Plan and Scaling Assessment of AP600 Test Program. Its format will be based on WCAP-14141, AP600 Test and Analysis Plan. The purpose of the report will be to provide the information necessary for the NRC staff to determine whether the AP600 test programs are sufficient to meet the requirements of 10 CFR Part 52 for an application for Design Certification of an AP1000. This report will include the following:

- Description of the AP1000 plant focusing on design changes to AP600 that are potentially important with respect to the performance of the passive safety systems
- An overview description of the AP600 test programs and their applicability to AP1000
- Discussion of important thermal-hydraulic phenomenon for modeling AP1000 performance
- Scaling assessment of the AP600 tests to the AP1000 plant
- Justification of the use of validated AP600 analysis codes for AP1000
- Results of AP1000 safety performance assessments using AP600 analysis codes
- Description of changes to AP600 analysis codes to be implemented as part of AP1000 design certification

This report will address the issues identified in the letter from the NRC as well as the issues identified in the letter from the ACRS. An outline of the proposed report is included. The resolution of this issue will be a determination by NRC of whether the AP600 test program meets the requirements of 10 CFR Part 52 for the AP1000.

Outline of AP1000 Analysis Plan and Scaling Assessment

1.0 Introduction
2.0 AP1000 Design Description
- 2.1 Overall Plant Description
- 2.2 Reactor Coolant System Design
  - 2.2.1 Reactor Design
  - 2.2.2 Steam Generator Design
  - 2.2.3 Reactor Coolant Pump Design
  - 2.2.4 Pressurizer and Loop Arrangement
- 2.3 Passive Core Cooling System Design
  - 2.3.1 Passive Core Cooling System Design Margins Assessment
- 2.4 Containment and Passive Containment Cooling System Design
  - 2.4.1 Containment and PCS Design Margins Assessment

3.0 Important Thermal-Hydraulic Phenomenon for Modeling the AP1000 System Performance
4.0 AP600 Test Program
5.0 Scaling Assessment of the AP600 Test Program
- 5.1 Passive Core Cooling System
  - 5.1.1 Separate Effects Phenomenon
    - 5.1.1.1 Automatic Depressurization
    - 5.1.1.2 Core Makeup Tank
    - 5.1.1.3 Passive Residual Heat Removal
  - 5.1.2 Integral System Phenomenon
    - 5.1.2.1 LOCA Phenomenon
      - 5.1.2.1.1 Automatic Depressurization
      - 5.1.2.1.2 Transition to IRWST Injection
      - 5.1.2.1.3 Sump Injection
    - 5.1.2.2 Integral System Test Matrices
- 5.2 Containment Performance Phenomenon
- 5.3 Departure from Nucleate Boiling Tests

6.0 Safety Analysis Results Comparisons
- 6.1 Transient Performance Assessment
- 6.2 Loss of Coolant Accident Performance Assessment
  - 6.2.1 Small Break LOCA
    - 6.2.1.1 Two-Inch Cold Leg Break
    - 6.2.1.2 Direct Vessel Injection Line Break
    - 6.2.1.3 Long-Term Cooling
  - 6.2.2 Large Break LOCA
- 6.3 Containment Performance Assessment
  - 6.3.1 Steam Line Break
  - 6.3.2 LBLOCA

7.0 Applicability of AP600 Safety Analysis Codes to AP1000
- 7.1 WCOBRA/TRAC Code Validation for AP1000
  - 7.1.1 LBLOCA
  - 7.1.2 SBLOCA
  - 7.1.3 Long-Term Cooling
- 7.2 NOTRUMP Validation for SBLOCA
- 7.3 LOFTRAN_AP Code Validation
- 7.4 WGOTHIC Containment Code

8.0 Conclusions
9.0 References

Applicability of AP600 Analysis Codes to AP1000

As part of the design certification application for the AP600, Westinghouse performed extensive code development and validation activities to develop analysis tools suitable for performing Chapter 15 accident analyses for the AP600. The NRC and the Advisory Committee on Reactor Safeguards (ACRS) have performed extensive reviews of the code development and validation programs for the computer codes developed for the AP600. It is recognized that certain limitations of the codes were identified in NUREG-1512. In these cases, the acceptability of the codes for the AP600 is based, in part, on the large safety margins provided by the AP600. Westinghouse will address the limitations identified in NUREG-1512 for the AP600 computer codes used for safety analysis and will demonstrate the appropriateness of their use for the AP1000.

Westinghouse will provide safety analysis assessments of the AP1000 using the AP600 analysis codes. These assessments will be included in the AP1000 Analysis Plan and Scaling Assessment. These assessments will not be a complete set of Chapter 15 accident analyses, but will be a representative sampling of analyses demonstrating the performance of the AP1000 safety systems.

Based on the conclusions of NUREG-1512 as well as the scaling assessments and analysis, Westinghouse will provide an assessment of the applicability of each code to the AP1000, and will identify any code changes necessary. This assessment will be provided as part of the AP1000 Analysis Plan and Scaling Assessment Report.

In addition, Westinghouse will provide an assessment of the AP1000 passive core cooling system design margins with respect to safety injection performance characteristics. The relative margin between the performance of the AP600 and the AP1000 passive core cooling system features will be assessed during the minimum core inventory time period at the start of IRWST injection following a small LOCA. This assessment will address the relative performance margins in the IRWST injection paths and the ADS stage 4 vent paths. The line resistances of these paths will be used together with consistent boundary conditions to provide a simple calculation of the comparative injection and venting flow rates. The purpose of this evaluation is to provide a simple estimate of the relative margin of the AP1000 as compared to the AP600. The assessment will present the important inputs, boundary conditions and calculated results and will discuss the meaning and significance of the results. This assessment is not meant to replace any of the Chapter 15 accident analyses that would be provided as part of the AP1000 Application for Design Certification. It is provided for informational purposes to assist the staff and ACRS to assess the margin of safety that will be provided by the AP1000 passive safety systems for the particular phases of the LOCA events that are most sensitive to the code limitations outlined in NUREG-1512.

The resolution of this issue will be an evaluation by the NRC of the acceptability of the AP600 analysis codes, including proposed changes, for performing accident analysis for the AP1000.

Design Acceptance Criteria

The AP1000 Design Certification application is expected to include less design detail than that provided in the AP600 Design Certification application. The General Arrangement, structural configuration, equipment and piping layout of the AP1000 are substantially the same as the AP600. However, qualification analyses will be deferred to the Combined License applicant. This affects the design detail available during Design Certification in the following areas:

Seismic analyses	(DCD Sections 2 and 3.7)
Structural design	(DCD Section 3.8)
Piping design	(DCD Section 3.6 and 3.9)

The objective in phase two for this issue is for Westinghouse and NRC to agree on the level of detail to be provided in an application for Design Certification for the AP1000. In phase two, Westinghouse will provide markups of the above listed sections of the AP600 DCD. These markups will show the level of information proposed for the AP1000 DCD. The AP1000 DCD will retain the methodology and design criteria for the COL applicant that references an AP1000 plant. Where the AP600 DCD contained results of analyses, the AP1000 DCD will identify information to be provided by the Combined License applicant. COL requirements and DAC will be proposed similar to those employed in the DCD for other certified standard plant designs (i.e. System 80+).

Analyses and evaluation will be provided in phase two for a hard rock site. The results of these analyses are intended in phase two to provide NRC with an understanding of the effect of the AP1000 configuration changes on the seismic results previously provided for the AP600. Additional review of these analyses should be deferred to the review of the AP1000 Design Certification Application.

In addition, Westinghouse will provide a draft Design Acceptance Criteria (DAC) for the AP1000 piping design, seismic design, and structural design. Resolution of this issue will be a determination by the NRC that the AP1000 can utilize Design Acceptance Criteria in the areas of piping design, seismic design, and structural design.

Exemptions

The purpose of this item is to identify which exemptions granted for the AP600 design certification can be retained for the AP1000 application. Westinghouse will identify the exemptions that will be requested for the AP1000 application and will provide justification for these exemptions in accordance with the requirements for 10 CFR 50.12.

Enclosure 3
Westinghouse Comments on Phase 1 Results
(Enclosure to NRC letter of July 27, 2000)

Item 1 – Scope of NRC Review

There are no comments on this item at this time.

Items 2 and 3 – Test Program and Analysis Plan

The test reviews are the most important reviews of the Phase 2 program. Westinghouse notes that the NRC staff estimates for the review of the applicability of the AP600 tests to the AP1000 assumes that a single staff member with no prior AP600 experience will need "to spend a significant amount of time reviewing the AP600 test program to prepare for the Phase 2 assessment." Westinghouse requests that the NRC make every effort to assign the reviewers who performed the test assessment for the AP600 Design Certification Review. Using the original reviewers would demonstrate application of NRC performance goal number three, "Make NRC activities and decisions more effective, efficient and realistic." The test and analysis review effort for the AP600 Design Certification involved a significant cross-section of the NRC technical staff and included input from the Office of Nuclear Regulatory Research. It is expected that experienced AP600 reviewers from the staff and research would require significantly less hours than would be required for a new reviewer unfamiliar with the AP600. We believe that a successful review will result if a group of NRC experts experienced in the Design Certification of the AP600 can form a consensus opinion on the test program issues.

Westinghouse has revised our deliverable for these tasks. The detailed outline of the AP1000 Analysis Plan and Scaling Assessment of AP600 Test Program shows that results of safety analysis assessments will be provided. In addition, the AP1000 Passive Core Cooling System Design Margins Assessment will be provided as section 2.3.1 of the report.

Separate Effects Tests

The outline of the report has been revised based on the NRC staff feedback to explicitly address the separate effects tests of the PRHR, ADS, and CMT. These components for AP1000 are the same (scale, geometry, and configuration) as used in the AP600. Therefore, it is not expected that formal scaling assessments are necessary to justify the use of these separate effects tests databases. The report will address the basis of the acceptability of these test programs for the AP600, and will discuss the basis that these test programs are acceptable for an AP1000 application.

Integral Systems Tests

The NRC letter proposes that the test matrices for the integral systems test be reviewed to demonstrate that the test matrices adequately cover the AP1000 design. Westinghouse will address this issue in section 5.1.2.2 of the report by performing a scaling assessment that compares the range of break sizes tested for the AP600 to an equivalent range of break sizes for the AP1000. The results should demonstrate that the size of breaks tested for AP600 provide a sufficiently large range of equivalent AP1000 break sizes.

Formal scaling assessments will be performed for the ADS phase, transition to IRWST injection phase, and sump injection phase.

Critical Heat Flux

This issue will be addressed in section 5.1.4 of the AP1000 Analysis Plan and Scaling Assessment Report. Westinghouse will demonstrate the adequacy of the DNB correlations that will be used for AP1000.

WCOBRA-TRAC

In discussions with the NRC staff reviewer for this item, there are three major issues associated with the use of WCOBRA-TRAC that need to be addressed for AP1000. These three issues are:

1. The use of WCOBRA-TRAC for Long-Term Cooling analyses was acceptable based on the validation of the code against four specific OSU tests. Westinghouse must demonstrate that the scaling of the OSU test facility is sufficient for the AP1000, and that the tests used to validate WCOBRA-TRAC for AP600 are sufficient for the purposes of code validation for AP1000 long term cooling. This issue will be addressed in section 5.1.2 of the AP1000 Analysis Plan and Scaling Assessment.
2. The analysis of Long-Term Cooling for AP600 was performed using WCOBRA-TRAC in a "windows" mode. This approach was acceptable for the AP600 design certification and Westinghouse must demonstrate that this approach is still valid for the AP1000. This issue will be addressed in section 7.1.3 of the report.
3. Westinghouse should consider the performance of the passive safety systems with respect to the issue of boron precipitation in the core during long-term core cooling post-LOCA. In the AP600, Westinghouse addressed this issue by performing calculations that demonstrated that boron precipitation in the core would not occur due to the moisture carryover of liquid out the 4th stage ADS valves. Results of these calculations demonstrated significant margin such that the amount of liquid leaving the core via the 4th stage ADS valves would have to be reduced by more than an order of magnitude before boron precipitation in the core could occur. Westinghouse agrees that this issue will need to be addressed and intends to address it as part of an application for Design Certification of an AP1000 (not in current review phase).

LOFTRAN/LOFTTR2

Westinghouse will address the issues raised regarding the use of LOFTRAN for AP1000 in section 7.3 of the report.

NOTRUMP

The issues identified in the letter and the subsequent phone call with the cognizant staff reviewer will be addressed in section 7.2 of the report. In addition, the issues raised by the ACRS in the letter on AP1000 will be addressed.

WGOTHIC

Westinghouse will address the issues regarding heat and mass transfer and water coverage characteristics raised in the opening paragraphs of the discussion on WGOTHIC in section 5.1.3 of the report. Scaling of these phenomenon with respect to the test facility will be formally assessed. The following refers to the numbered items in the NRC letter.

1. A PIRT evaluation will be provided as section 3 of the report.
2. Evaluations performed by Westinghouse and the NRC for the AP600 utilized a lumped parameter nodalization. Justification for the use of a lumped parameter nodalization was based on:
   - Froude number scaling
   - Mixing studies (boundary layers, buoyant plumes)
   - Scaled test facilities
   - Lumped parameter nodalization studies

   In addition, AP600 containment performance for LBLOCA exhibited a large margin with respect to design limits for analysis of accidents using realistic assumptions. Westinghouse will perform Froude number scaling for the AP1000 in section 5.2 of the report. Westinghouse will provide its rationale as to the applicability of the AP600 mixing studies, scaled test facilities, and lumped parameter nodalization studies to the AP1000 in the Analysis Plan and Scaling Assessment report. In addition, the AP1000 containment design margin for LBLOCA will be demonstrated such that the lumped parameter nodalization approach could be found to be acceptable by the NRC.
3. The limitations and restrictions for WGOTHIC will be addressed in section 7.4 of the report.

Item 4 – AP1000 Probabilistic Risk Assessment

As discussed in the cover letter, Westinghouse will defer this activity to Design Certification. The issues raised in the NRC letter would be addressed as part of the review of the basis for the AP1000 PRA acceptance criteria.

Item 5 – Defer Selected Design Activities

The following clarifies our position with regards to the seven issues raised in the NRC letter. The issues identified in the NRC letter are issues that will be addressed either as part of the AP1000 Design Certification (Phase 3), or by the COL applicant. The impact of these issues on the phase 2 scope of work is an assessment by the staff of the acceptability of the draft Design Acceptance Criteria (DAC).

1. In Phase 3, Westinghouse will demonstrate dynamic stability for the rock sites. A COL applicant information item will be added requiring dynamic stability to be confirmed by each COL applicant for sites that are not covered by the rock site demonstration.

2. In Phase 3, Westinghouse will provide an assessment of the foundation mat acceptability. Westinghouse will define interface loads and acceptance criteria in the Design Acceptance Criteria (DAC) (a draft of the structural DAC will be provided in Phase 2). The COL Applicant will perform a basemat design to complete the structural DAC.

3. In Phase 3, Westinghouse will provide assessments of critical regions of the structural design. This will include the modular walls of the in-containment refueling water storage tank. The structural design of these critical regions will be performed by the COL applicant in completing the structural DAC.

4. In Phase 3, Westinghouse will provide justification for use of any newer editions of the design codes (e.g. ASME 1999 Addenda for the containment vessel).

5. In Phase 3, Westinghouse will perform an assessment of the subcompartment pressurization analyses. The piping and structural designs will be performed by the COL applicant in accordance with the piping and structural DACs. These DACs will be provided in phase 2 and will address subcompartment pressurization loads. Westinghouse does not expect significant changes to the thermal and pressure loads because there was significant margin in these analyses for AP600.

6. In Phase 3, Westinghouse will describe the containment vessel design and its performance under severe accident conditions.

7. Westinghouse will incorporate these comments in the draft DCD sections.

Exemptions

Westinghouse has no additional comments on this issue.

Project Management for Phase 2

Westinghouse requests that project management of Phase 2 enable us to monitor costs on a monthly basis. We would envision monthly reports that would identify manpower resources expended on the project. In addition, we request that the costs be tracked separately as follows:

- Tests and Analysis Review
- Design Acceptance Criteria
- Exemptions / Project Management

The purpose of this request is to help us better manage our total costs on the project.

Enclosure 4

Westinghouse Categorization of ACRS Issues Related to the Review of the AP1000 Design

The following table summarizes our categorization of the items raised in the ACRS letter as either Phase 2 issues, Design Certification issues, or issues to be addressed by the COL applicant.

Item	Categorization	Comments
1. Application for Design Certification		
a	Phase 2 / DC	There are two parts to this item. The scope of the SSAR Chapter 15 accident analyses will be addressed at Design Certification. The issue of whether the AP600 analysis codes need to be revalidated will be addressed in Phase 2.
b	Phase 2	Section 7.2 of the AP1000 Analysis Plan and Scaling Assessment
c	Phase 2	Section 5 of the AP1000 Analysis Plan and Scaling Assessment
d	DC	Based on our current plan, this issue would be addressed during Design Certification.
e	DC	Evaluation of core performance will be part of Design Certification, although some aspects of core performance (DNB correlation) will be addressed as part of Phase 2.
f	Phase 2	An evaluation of the impact of performance ratings (i.e. design pressures and temperatures, system design capacities, etc.) will be addressed in Phase 2.
g	DC	Detailed seismic analysis of the containment is addressed as part of Design Certification.
2. Probabilistic Risk Assessment (will be submitted for Design Certification)		
a	DC	This will be addressed in the level 2 PRA
b	DC	This will be addressed in the level 2 PRA
c	DC	This will be addressed in the level 2 PRA
d	DC	This will be addressed in the level 1 PRA
e	DC	This will be addressed in the level 2 PRA
f	DC	This will be mainly addressed in the level 2 PRA. Aspects of containment mixing will be addressed in Phase 2.